

UNIVERSITI TEKNOLOGI MARA

TECHNICAL REPORT

**SOLVING OF LANE-EMDEN EQUATION
USING SEMI-ANALYTICAL ITERATIVE
METHOD**

P9S18

MASITOH BT MUSTAFAH (2016962553)

NOR AFIF BIN MUHAMMAD NOR (2016728389)

PUTERI FATIN SYAZWANI BT MOHAMAD (2016718299)

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Abstract

Lane-Emden is an equation that are commonly known in solving singular initial value problems that was formulated by using second order nonlinear differential equations. It is a type of equations that have significant applications in exploring mathematics, physics, astrophysics fields and technical world. Hence, most algorithms to solve Lane-Emden type of problems were usually be solved either in perturbation techniques or series solutions. Also, it was used as the core to verify new methods and able to attract many attention from many mathematicians and physicians to investigate more about Lane-Emden. Recently, many research about solving Lane-Emden equations have been done by using different type of methods but to solve using Semi-Analytical Iterative Method are still new and undiscover. In this research, Lane-Emden equation of index m and linear homogeneous Lane-Emden was solved by employed Semi-Analytical Iterative Method or also known as TAM. This method was popularized by Temimi and Ansari (TAM) for approximate solutions of differential algebraic equations that appear in many engineering and applied science applications. Aftermath, to show the result obtained was comparable, it was compared with the existing results from Adomian Decomposition Method (ADM) and Homotopy Perturbation Method (HPM). To prove the reliable and efficient of the result, the error between an existing result from ADM with the result of Lane-Emden equation of index m obtained from Maple software was computed. Error measurements of the approximate solutions were studied by using absolute error.

Contents

Acknowledgements	i
Abstract	ii
Contents	iii
List of Tables	v
List of Figures	vi
1 Introduction	1
1.1 General Introduction	1
1.2 Problem Statement	3
1.3 Significant and Benefit of The Project	3
1.4 Scope of The Project	4
1.5 Research Objectives	4
1.6 Report Organization	4
2 Literature Review	5
2.1 Lane-Emden Equation	5
2.2 Semi-Analytical Iterative Method	10
3 Methodology	12
3.1 Lane-Emden Equations	12
3.2 Semi-Analytical Iterative Method (TAM)	13
4 Result and Discussion	16
4.1 Problem 1: Solution of Lane-Emden equation by using index m	16
4.1.1 Case $m = 0$	17
4.1.2 Case $m = 1$	19

4.1.3 Case $n = 5$	23
4.2 Problem 2: Solution of Linear Homogeneous Lane-Emden equation	27
5 Conclusion and Recommendation	31
5.1 Conclusions and Recommendation	31
References	33
Appendix A	36
Appendix B	40
Appendix C	45
Appendix D	52
Appendix E	55